What is claimed is:

1. An information processing apparatus including a processor that has at least one register and performs processing according to a machine language program, the register retaining data used in computation, the information processing apparatus comprising:

a compression judgment unit operable to judge whether the machine language program has information indicating that the data retained in the register should be compressed and then saved to a stack memory in response to call of a predetermined function; and

a save unit operable to, when the judgment by the compression judgment unit is affirmative, compress and then save the data retained in the register to the stack memory in response to call of the predetermined function.

2. The information processing apparatus of Claim 1, further comprising:

a decompression judgment unit operable to judge whether or not there is decompression information indicating that the data saved in the stack memory should be decompressed and then restored to the register in response to termination of the call of the predetermined function; and

a restore unit operable to, when the judgment by the decompression judgment unit is affirmative, decompress and

then restore to the register the data saved in the stack memory in response to termination of the call of the predetermined function.

3. The information processing apparatus of Claim 2, wherein the decompression judgment unit judges whether the machine language program has the decompression information.

4. The information processing apparatus of Claim 3, wherein, when the judgment by the compression judgment unit is affirmative, the save unit compresses and then saves the data retained in the register to the stack memory when execution of a call instruction for calling the predetermined function,

and when the judgment by the decompression judgment unit is affirmative, the restore unit decompresses and then restores to the register the data saved in the stack memory when execution of a return instruction for terminating the call of the predetermined function.

5. The information processing apparatus of Claim 3, wherein, when the judgment by the compression judgment unit is affirmative, the save unit compresses and then saves the data retained in the register to the stack memory when

a process for the predetermined function starts,

and when the judgment by the decompression judgment unit is affirmative, the restore unit decompresses and then restores to the register the data saved in the stack memory when the process for the predetermined function finishes.

6. The information processing apparatus of Claim 2,

wherein the save unit, when compressing and saving the data retained in the register to the stack memory, associates the decompression information with compressed data resulting from compressing the data retained in the register, and saves the decompression information and the compressed data in association to the stack memory,

the decompression judgment unit judges whether the stack memory has decompression information that is associated with data saved in the stack memory, and

the restore unit, when the judgment by the decompression judgment unit is affirmative, decompresses and then restores to the register the data associated with the decompression information in response to termination of the call of the predetermined function.

7. The information processing apparatus of Claim 6,

wherein the save unit comprises:

a data conversion subunit operable to convert first data

retained in the register into second data according to a predetermined algorithm;

a comparison subunit operable to compare the data size of the second data with a threshold value that shows compression efficiency; and

a selective save subunit operable to, when the data size of the second data is smaller than the threshold value, save the second data to the stack memory, and when the data size of the second data is greater than the threshold value, save the first data to the stack memory.

8. The information processing apparatus of Claim 6,

wherein, when the judgment by the compression judgment unit is affirmative, the save unit compresses and then saves the data retained in the register to the stack memory when execution of a call instruction for calling the predetermined function,

and when the judgment by the decompression judgment unit is affirmative, the restore unit decompresses and then restores to the register the data saved in the stack memory when execution of a return instruction for terminating the call of the predetermined function.

9. The information processing apparatus of Claim 6,

wherein, when the judgment by the compression judgment

unit is affirmative, the save unit compresses and then saves the data retained in the register to the stack memory when a process for the predetermined function starts,
and when the judgment by the decompression judgment unit is affirmative, the restore unit decompresses and then restores to the register the data saved in the stack memory when the process for the predetermined function finishes.

10. An information processing method used with an information processing apparatus including a processor that has at least one register and performs processing according to a machine language program, the register retaining data used in computation, the information processing method comprising:

a compression judgment step of judging whether the machine language program has information indicating that the data retained in the register should be compressed and then saved to a stack memory in response to call of a predetermined function; and

a save step of, when the judgment at the compression judgment step is affirmative, compressing and then saving the data retained in the register to the stack memory in response to call of the predetermined function.

11. A program conversion apparatus comprising:

an acquisition unit operable to acquire an input program that includes one or more functions;

a judgment unit operable to judge, from the input program, whether, in response to call of a predetermined function, data retained in at least one register of a processor should be compressed and then saved to a stack memory, or should be saved to the stack memory without being compressed; and

a conversion unit operable to, when the judgment unit has judged that the data should be compressed and then saved, convert the input program into an output program that includes indication information, the indication information indicating, to the processor, that the data retained in the register should be compressed and then saved to the stack memory.

12. The program conversion apparatus of Claim 11,

wherein the judgment unit includes:

a detection subunit operable to detect a stack access function in the input program, the stack access function referring to the stack memory in which the data in the register have been saved,

and the judgment unit judges that the data retained in the register should be saved to the stack memory without being compressed in response to call of any of the stack access function and functions that position higher order than the

stack access function in a hierarchical structure of functions included in the input program.

13. The program conversion apparatus of Claim 11,

wherein the judgment unit includes:

a pre-specification detection subunit operable to detect a pre-specified function in the input program, the pre-specified function being a function to which information indicating that the data retained in the register should be compressed and then saved to the stack memory has been added in advance,

and the judgment unit judges that the data retained in the register should be compressed and then saved to the stack memory in response to call of the pre-specified function.

14. The program conversion apparatus of Claim 11,

wherein the judgment unit includes:

a nest information creation subunit operable to create nest information that shows a hierarchical structure of functions included in the input program,

and when the predetermined function includes therein a subroutine, the judgment unit judges whether, in response to call of the predetermined function, the data retained in the register should be compressed and then saved to the stack memory, or should be saved to the stack memory without being

compressed, based on the nest information.

15. The program conversion apparatus of Claim 11, wherein the conversion unit includes:

a compression information addition subunit operable to add, to a call instruction for calling the predetermined function, information indicating to the processor that the data retained in the register should be compressed and then saved to the stack memory when the predetermined function is called; and

a decompression information addition subunit operable to add, to a return instruction for terminating the call of the predetermined function, information indicating to the processor that the data saved in the stack memory should be decompressed and then restored to the register when the call of the predetermined function is terminated.

16. The program conversion apparatus of Claim 11, wherein the conversion unit includes:

a compression information addition subunit operable to add, to the predetermined function, information indicating to the processor that the data retained in the register should be compressed and then saved to the stack memory when a process for the predetermined function starts; and

a decompression information addition subunit operable

to add, to the predetermined function, information indicating to the processor that the data saved in the stack memory should be decompressed and then restored to the register when the process for the predetermined function finishes.